

CORRECTED VERSION

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
18 November 2004 (18.11.2004)

PCT

(10) International Publication Number
WO 2004/098750 A1

(51) International Patent Classification⁷: **B01D 53/22**,
69/02, C01B 3/38, 13/02

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(21) International Application Number:
PCT/GB2004/001787

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(22) International Filing Date: 28 April 2004 (28.04.2004)

(81) Designated States (*unless otherwise indicated, for every
kind of national protection available*): AE, AG, AL, AM,
AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,
KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,
MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,
PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,
TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM,
ZW.

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
0310281.1 3 May 2003 (03.05.2003) GB

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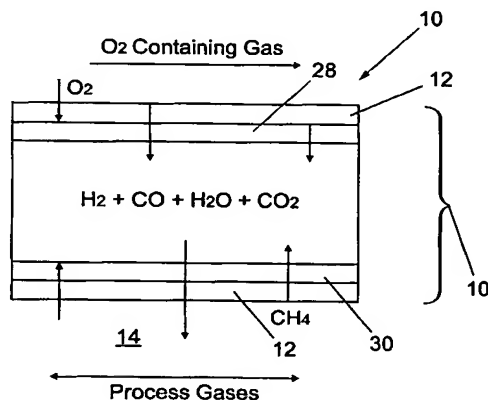
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(84) Designated States (*unless otherwise indicated, for every
kind of regional protection available*): ARIPO (BW, GH,
GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,
ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,
FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI,

[Continued on next page]

(54) Title: A MEMBRANE APPARATUS AND METHOD OF PREPARING A MEMBRANE AND A METHOD OF PRODUC-
ING HYDROGEN



(57) Abstract: The present invention discloses a method, apparatus and method of manufacturing an apparatus; all to produce hy-
drogen gas, particularly synthesis gas. Preferred embodiments of the invention include an alpha alumina membrane which has been
treated with a TiO₂ wash coat on one side and has an active gamma alumina layer on an opposite side. A metal catalyst, preferably
rhodium, is deposited within the pores of the alumina. Oxygen travels through the membrane and is activated before contacting
methane on the other side of the membrane and forming synthesis gas through partial oxidation of the methane. Embodiments of
the invention have a number of benefits including the high conversion rate of oxygen (100 %), the separate feed streams of methane
and oxygen which allow for optimal ratios to be used without danger of explosion, and the opportunity to vary the feed rates without
changing the products formed. Normally gaseous hydrocarbons recovered from remote oil wells (e.g. offshore oil wells) can thus
be converted to synthesis gas and then to normally liquid hydrocarbons via a Fischer-Tropsch type reaction. The normally liquid
hydrocarbons are easier to transport away from the remote oil well than normally gaseous hydrocarbons.

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SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(15) Information about Correction:

see PCT Gazette No. 49/2005 of 8 December 2005, Section II

Published:

— *with international search report*

(48) Date of publication of this corrected version:

8 December 2005

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.